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Dprtmt f Mthmtcs, VT hpl Uvrsty

ppld Nmrcl Mthds (MT23)

**Prblm St-2**

**Solution of Algebraic and Transcendental Equations**

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**Q1.** Which iteration formula will you use to solve the equation using fixed point iteration method? Justify your answer. Use the iteration formula to find a real root of the equation correct to three decimal places.

**Q2.** Evaluate by fixed point iteration method, correct to four decimal places. Give justification for your chosen iteration formula.

**Q3.** Apply fixed point iteration method to find the negative root of the equation correct to four decimal places.

**Q4.** Find the order of the convergence of the iteration formula . It is given that approaches to 3 as grows.

**Q5.** A sequence is defined by . Show that it gives cubic convergence to the root .

**Q6.** We wish to compute the root of the equation using the formula . Find the value of which gives rapid convergence.

**Q7.** The polynomial has a real root between 15 and 20. Apply the Newton-Raphson method to this function using an initial guess of 16.15. Explain your results.

**Q8.** Findthe positive root of correct to three decimal places, using the Newton-Rapson method.

**Q9.** Develop an algorithm using the Newton-Rapson method, to find the fourth root of a positive number and hence, find  **.**

**Q10.** Consider the sequence obtained from the Newton-Rapson method. Starting from an initial choice, where will this sequence approach as grows?

**Q11.** Use secant method to find an approximate root of the function such that .

**Q12.** Find the interval in which the smallest positive root of the equation lies. Determine the root using secant method.

**Q13.** The current in an electric circuit is given by , where is in seconds. Find the value of correct to three decimal places for amp.

**Q14.** You are designing a spherical tank to hold water for a small village in a developing country. The volume of liquid it can hold can be computed as , where volume [, depth of water in tank [m], and the tank radius[m]. If R = 3 m, what depth must the tank be filled to so that it holds 30 ? Use three iterations of the most efficient numerical method possible to determine your answer. Also, provide justification for your choice of method.

**Q15.** The bacteria concentration in a reservoir varies as . Calculate the time required for the bacteria concentration to be 0.5.